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Introduction to Systematic Reviews

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INTRODUCTION TO SYSTEMATIC REVIEWS

Graduate Student Immersion Program, 2022

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Objectives

By the end of today's session, you will be able to...



Identify the differences between a traditional literature review and a systematic review

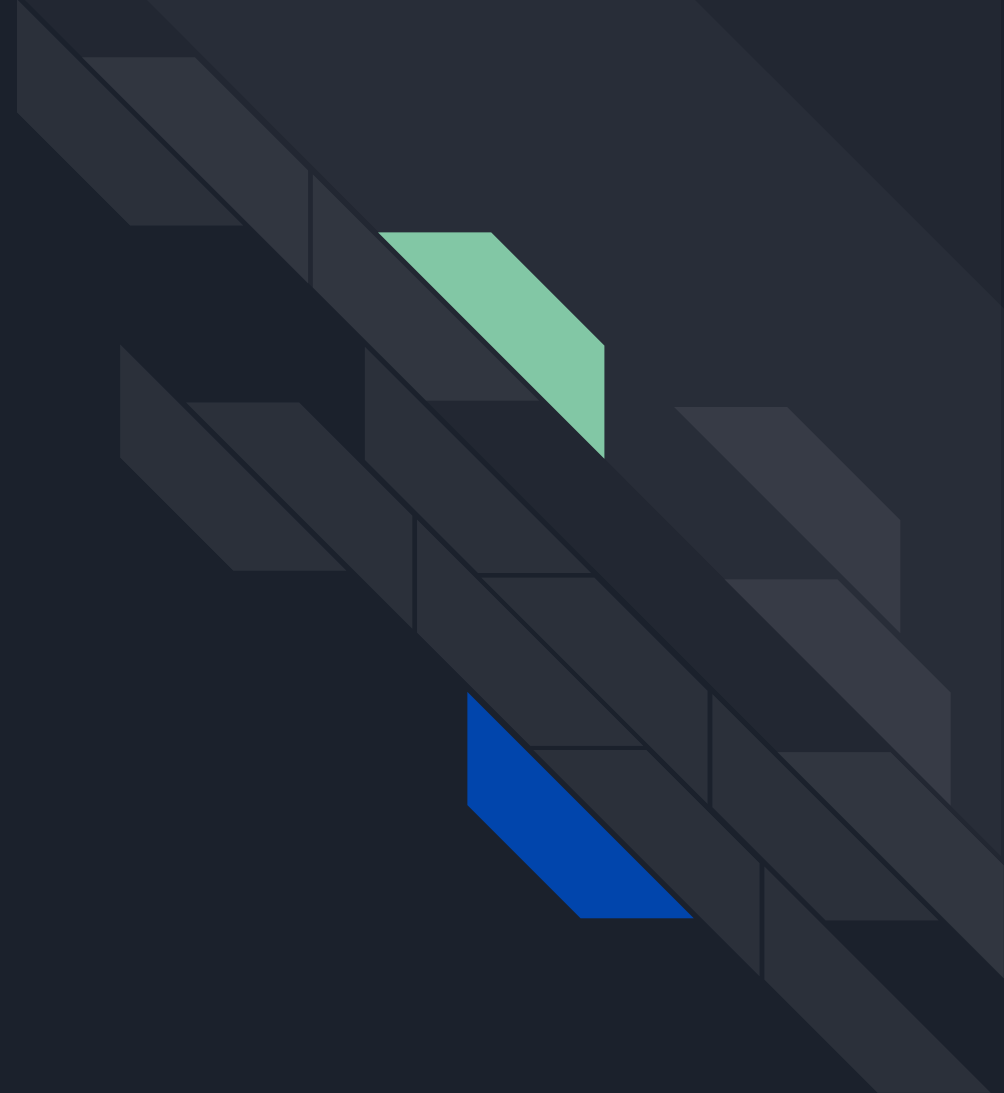


Identify authority organizations for evidence synthesis methods



Identify an appropriate protocol registry for your discipline

What is a *Systematic* Review?





Definition

“A systematic review summarizes the results of available carefully designed healthcare studies (controlled trials) and provides a high level of evidence on the effectiveness of healthcare interventions. Judgments may be made about the evidence and inform recommendations for healthcare.”

Cochrane Consumer Network. <https://consumers.cochrane.org/what-systematic-review>



What is a Systematic Review?

Use *transparent* procedures to find, evaluate and synthesize the results of independent studies.

Procedures are explicitly *defined in advance*, to assure that the process is *transparent* and can be *replicated*.

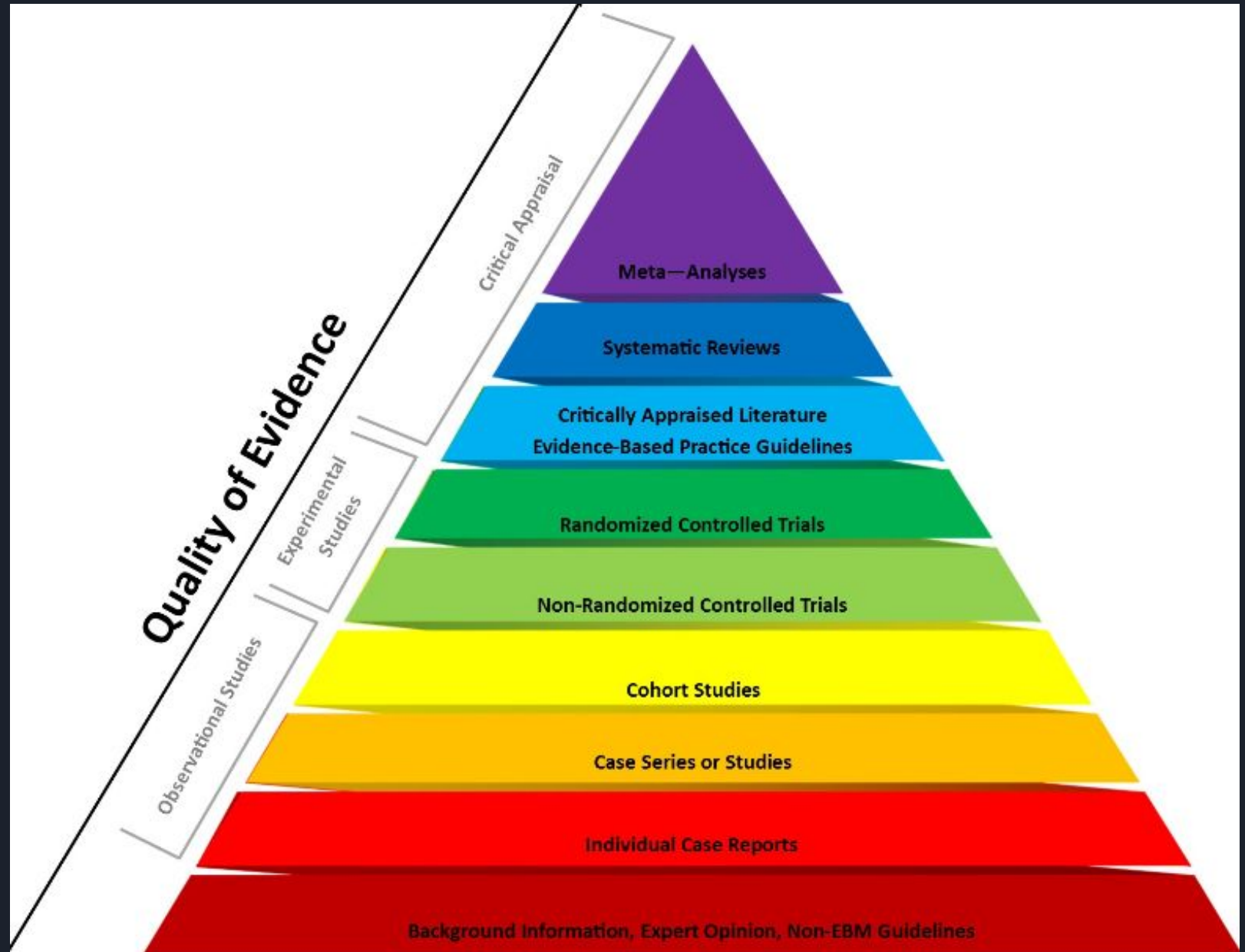
This process is also designed to *minimize bias*.



A Systematic Review Must Have:

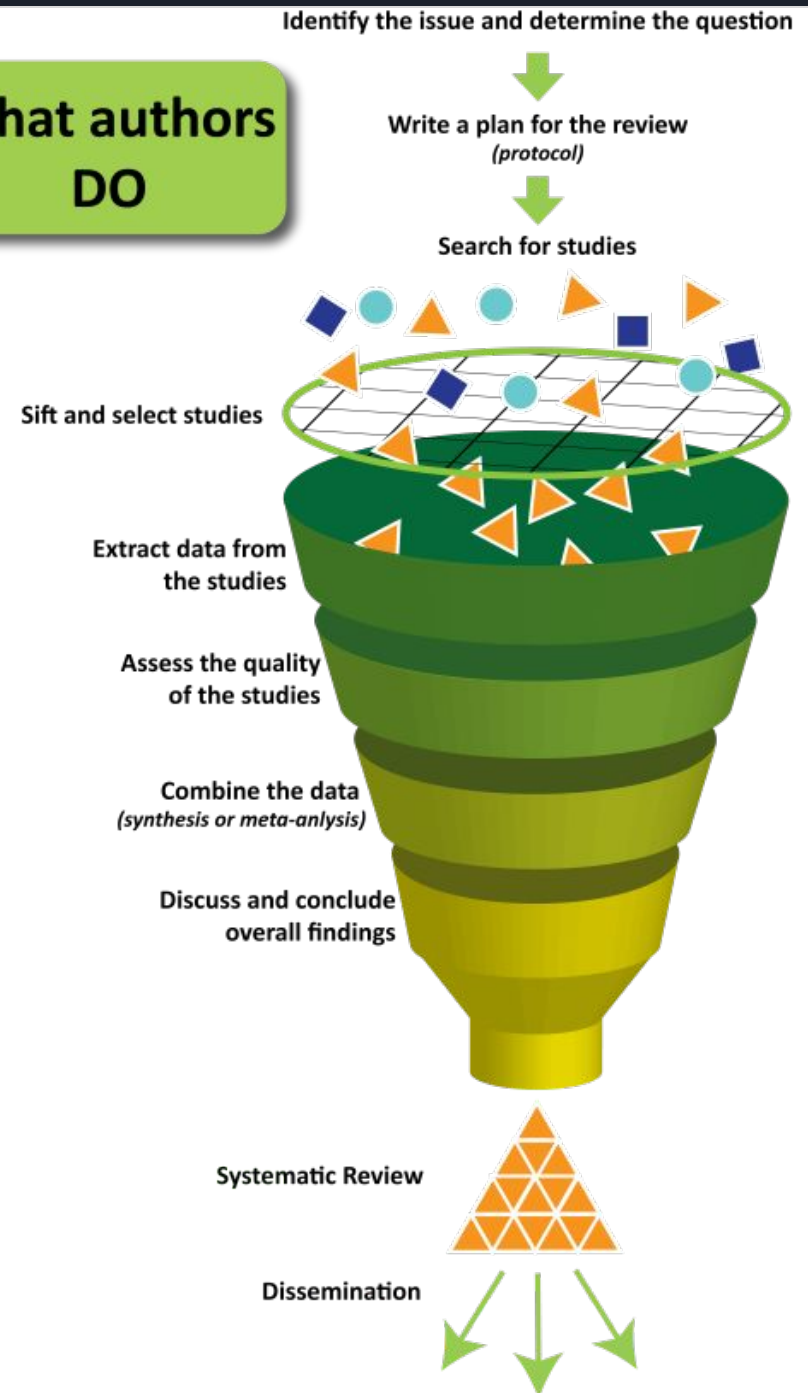
- ✓ Clear inclusion and exclusion criteria
- ✓ Explicit search strategy
- ✓ Systematic coding and analysis of included studies
- ✓ Meta-analysis (where possible)

Evidence Pyramid




What does this process look like practically?

What authors DO



Graphic from the Cochrane Collaboration



Label	Description	Search	Appraisal	Synthesis	Analysis
Literature Review	Generic term: published materials that provide examination of recent or current literature. Can cover wide range of subjects at various levels of completeness and comprehensiveness. May include research findings	May or may not include comprehensive searching	May or may not include quality assessment	Typically narrative	Analysis may be chronological, conceptual, thematic, etc.
Systematic Review	Seeks to systematically search for, appraise and synthesis research evidence, often adhering to guidelines on the conduct of a review	Aims for exhaustive, comprehensive searching	Quality assessment may determine inclusion/exclusion	Typically narrative with tabular accompaniment	What is known; recommendations for practice. What remains unknown; uncertainty around findings, recommendations for future research



Systematic Review vs. Literature Review

A systematic review


- Focused or narrow research question
- Rigorous & reproducible
- Methods clearly defined
- Critical appraisal of the evidence
- Provides a complete, exhaustive summary of current evidence relevant to the research question

A literature review

- A generic summary or overview of a topic, broad research question
- Subjective
- Methods not defined
- Purpose is to educate the audience about a topic

SR Methods Authorities

Health / Medicine	Social Sciences	Environmental Sciences	Multiple Disciplines
<ul style="list-style-type: none">• Cochrane Handbook for Systematic Reviews of Interventions• Institute of Medicine (IOM) Standards for Systematic Reviews• Systematic Review for Animals & Food• Guidelines for Systematic Reviews of Health Promotion and Public Health Interventions	<ul style="list-style-type: none">• Systematic Reviews in the Social Sciences: A Practical Guide• Campbell Collaboration	<ul style="list-style-type: none">• The Collaboration for Environmental Evidence	<ul style="list-style-type: none">• EPPI-Centre (Education, Health Promotion, Public Health, Social Welfare, International Development)



14 Main Types of Systematic Review

- Critical Review
- Literature Review
- Mapping Review
- Meta-analysis
- Mixed Studies/Mixed Methods Review
- Overview
- Qualitative Systematic Review
- Rapid Review
- Scoping Review
- State-of-the-art Review
- Systematic Review
- Systematic Search and Review
- Systematized Review
- Umbrella Review

DOI: 10.1111/j.1471-1842.2009.00848.x

Review Article

A typology of reviews: an analysis of 14 review types and associated methodologies

Maria J. Grant* & Andrew Booth†, *Salford Centre for Nursing, Midwifery and Collaborative Research (SCNMCR), University of Salford, Salford, UK, †School of Health and Related Research (SchARR), University of Sheffield, Sheffield, UK

Abstract

Background and objectives: The expansion of evidence-based practice across sectors has led to an increasing variety of review types. However, the diversity of terminology used means that the full potential of these review types may be lost amongst a confusion of indistinct and misapplied terms. The objective of this study is to provide descriptive insight into the most common types of reviews, with illustrative examples from health and health information domains.

Methods: Following scoping searches, an examination was made of the vocabulary associated with the literature of review and synthesis (literary warrant). A simple analytical framework—Search, Appraisal, Synthesis and Analysis (SALSA)—was used to examine the main review types.

Results: Fourteen review types and associated methodologies were analysed against the SALSA framework, illustrating the inputs and processes of each review type. A description of the key characteristics is given, together with perceived strengths and weaknesses. A limited number of review types are currently utilized within the health information domain.

Conclusions: Few review types possess prescribed and explicit methodologies and many fall short of being mutually exclusive. Notwithstanding such limitations, this typology provides a valuable reference point for those commissioning, conducting, supporting or interpreting reviews, both within health information and the wider health care domain.

Useful in These Disciplines and More!

Psychology



RESEARCH Review

Stress, Anxiety, and Weight Gain among University and College Students: A Systematic Review

Suzan A. Haidar, MS; N. K. de Vries, PhD; Mirey Karavetian, PhD; Rola El-Rassi, MS



Environmental Science

17 © IWA Publishing 2017 Journal of Water and Health | 15.1 | 2017

Psychosocial impacts of the lack of access to water and sanitation in low- and middle-income countries: a scoping review

Elijah Bisung and Susan J. Elliott

Agriculture

Thorn et al. *Environ Evid* (2016) 5:13
DOI 10.1186/s13750-016-0064-9

Environmental Evidence

SYSTEMATIC MAP

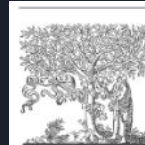
Open Access



What evidence exists for the effectiveness of on-farm conservation land management strategies for preserving ecosystem services in developing countries? A systematic map

Jessica P. R. Thorn^{1*}, Rachel Friedman², David Benz¹, Kathy J. Willis^{1,4,5} and Gillian Petrokofsky^{1,3}

Food Science



ELSEVIER

Contents lists available at ScienceDirect

Preventive Veterinary Medicine

journal homepage: www.elsevier.com/locate/prevetmed

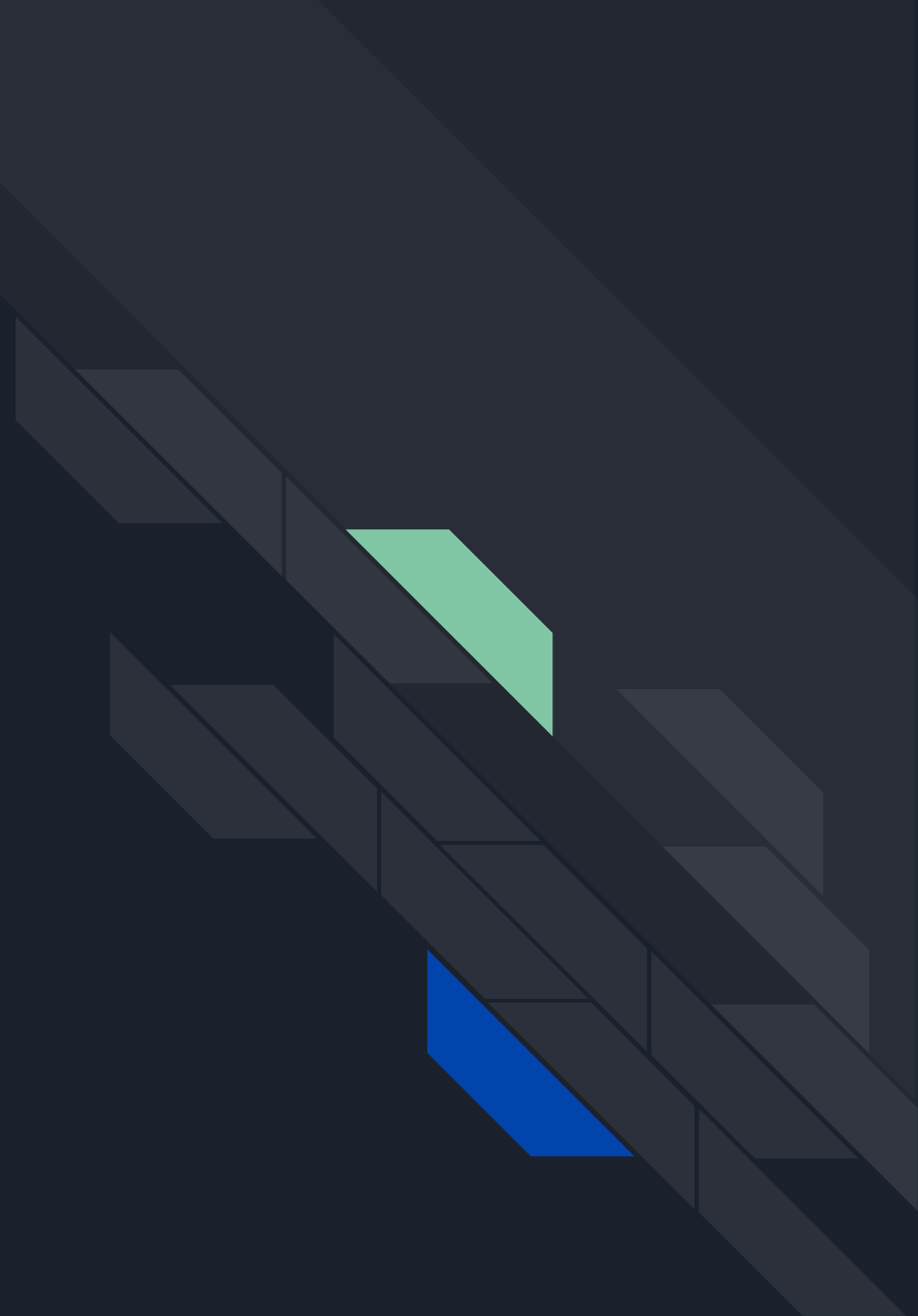


The application of knowledge synthesis methods in agri-food public health: Recent advancements, challenges and opportunities



Ian Young^{a,b,*}, Lisa Waddell^{a,b}, Javier Sanchez^c, Barbara Wilhelm^b, Scott A. McEwen^b, Andrijana Rajić^{b,d}

Getting Started with Your Systematic Review Project



Steps of a Systematic Review

1. Gather your team (*minimum* of 2, usually more)
2. Develop a protocol
 - a. Develop a focused research question
 - i. Helps determine what type of review to conduct
 - b. Search for previously published SRs on your topic
 - c. Define inclusion and exclusion criteria
 - d. Select databases & grey literature to search
 - e. Develop your search strategy and translate across information sources
 - f. Register your protocol
3. Search the literature
4. Select studies for inclusion
5. Assess study quality
6. Synthesize the findings
7. Interpret results and draw conclusions



What Do You Want to Know?

What is the relationship between baseline psychosocial factors and baseline patient-reported pain and function in individuals with non-arthritic hip disease?



Systematic Review & Meta-analysis

The objective of this study is to perform a rapid scoping review in order to determine the state of the evidence of ARC and ARC adaptations. We plan to evaluate the use of ARC and ARC adaptations with all populations, comparison conditions, and reported outcomes.



Rapid Scoping Review

To identify high-priority issues in lacrosse player safety and sport science for which there is a high level of published literature and where there is a dearth of published literature for the basis of policy-making.



Mapping Review

The type of question you ask helps you determine the type of review you should conduct.

Building a Search Framework: PICO Questions

P - Population/Problem

I - Intervention/Exposure

C - Comparison

O - Outcome

In 13 year old football players,
what is the effect of repeated
head injuries on quality of life?

Other Potential Considerations:

T - Time

S - Study Design

01	For an intervention/therapy:	In ____ (P), what is the effect of ____ (I) on ____ (O) compared with ____ (C) within ____ (T)?
02	For etiology:	Are ____ (P) who have ____ (I) at [Increased/decreased] risk for/of ____ (O) compared with ____ (P) with/without ____ (C) over ____ (T)?
03	For Diagnosis or diagnostic test:	Are (is) ____ (I) more accurate in diagnosing ____ (P) compared with ____ (C) for ____ (O)?
04	For Prevention:	For ____ (P) does the use of ____ (I) reduce the future risk of ____ (O) compared with ____ (C)?
05	For Prognosis/Predictions:	Does ____ (I) influence ____ (O) in patients who have ____ (P) over ____ (T)?
06	For Meaning:	How do ____ (P) diagnosed with ____ (I) perceive ____ (O) during ____ (T)?

Example PICO Question Templates for Question Type

Other Question Frameworks

For Qualitative Studies

- P - Population/Problem
- I - Phenomenon of Interest
- Co - Context

Example: What are the *experiences* (phenomenon of interest) of *caregivers providing home based care to patients with Alzheimer's disease* (population) in *Australia* (context)?

SPIDER

- S - Sample
- PI - Phenomenon of Interest
- D - Design
- E - Evaluation
- R - Study Type

Design: questionnaire, survey, or interview

Study Type: qualitative or mixed methods

Example: What are the *experiences* (evaluation) of *women* (sample) undergoing *IVF treatment* (phenomenon of interest) as assessed?

SPICE

- S - Setting
- P - Perspective (for whom)
- I - Intervention/Exposure
- C - Comparison
- E - Evaluation

Example: What are the *benefits* (evaluation) of a *doula* (intervention) for *low income mothers* (perspective) in the *developed world* (setting) compared to *no support* (comparison)?



Searching for Previously Published and in Process Systematic Reviews on Your Topic

Important step in the process

- Helps prevent research waste and duplication of effort
- Search databases for published reviews or published protocols
- Check protocol registries





Deciding Where to Search

For most biomedical systematic reviews it is recommended that you search at least 3 databases:

- [Medline](#) (using either the PubMed or Ovid interface)
- Embase (through [Scopus](#) or purchase a subscription)
- [Cochrane Library](#) – evidence based medicine

Other Possible Databases to Search:

- [Web of Science](#) - multidisciplinary
- [CINAHL](#) - nursing and allied health
- [APA PsycINFO](#) - psychology and psychiatry
- [ERIC](#) - education
- [Business Source Complete](#) - business
- Other topic specific or regional databases

All available through the Libraries' Databases
<https://databases.lib.wvu.edu/>

Search strategies will need to be translated to another database's syntax or controlled vocabulary.
Contact a librarian if you need assistance.

Supplemental Searching Techniques

- Forward/Backward Citation Searching
 - Scopus
 - Web of Science
 - Google Scholar
- Hand searching



Addiction Research & Theory

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SJR: 0.911

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2020

Vol. 28 Issue 6

Gendering research on online illegal drug markets
pp. 457-466 - Fleetwood, Jennifer; Aldridge, Judith; Ch



Supranational changes in drinking patterns: factor

Document title	Authors	Year	Source	Cited by
<input type="checkbox"/> 1  Expanding the limits of sex: a systematic review concerning food and nutrition in transgender populations Download PDF View Complete Issue	Gomes, S.M., Jacob, M.C.M., Rocha, C., (...), Lyra, C.O., Noro, L.R.A.	2021	Public Health Nutrition 24(18), pp. 6436-6449	1
<input type="checkbox"/> 2  A brief review of the science behind the design of healthy and sustainable plant-based foods <i>Open Access</i> Download PDF View Complete Issue	McClements, D.J., Grossmann, L.	2021	npj Science of Food 5(1),17	8

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Grey Literature

- Conference proceedings
- Research reports
- Government reports
- Dissertations, theses
- Research monographs
- ClinicalTrials.gov

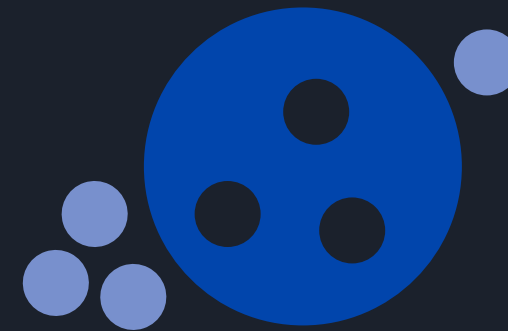
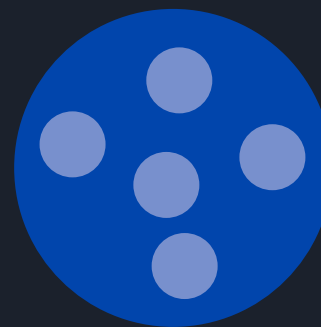
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ProQuest Dissertations & Theses (PQDT) Global is the world's most comprehensive collection of dissertations and theses from around the world, offering millions of works from thousands of universities. Each year hundreds of thousands of works are added. Full-text coverage spans from 1743 to the present, with citation coverage dating back to 1637.



Defining Inclusion & Exclusion Criteria

[Learn more about Inclusion/Exclusion Criteria \(linked\)](#)



Date

Exposure of Interest

Geographic Location of Study

Language

Participants

Peer Review

Reported Outcomes

Setting

Study Design

Type of Publication



**Planning Your
Search Strategy
is the
Most Important Part
of the Searching
Process**



What Makes a Search Systematic?

Single, well developed search strategy for each database consisting of keywords AND database subject headings

- Comprehensive
- Reproducible
- Multiple databases searched (normally)

Remember:

Your search methodology and search strategies will be published with the final systematic review.

Testing Terms, Building Search, and Documenting Decisions

Line	Search	Results	Database & Date	Notes
#1	"racquet sports"[MeSH Terms] OR ("racquet"[All Fields] AND "sports"[All Fields]) OR "racquet sports"[All Fields] OR ("racquet sports"[MeSH Terms] OR ("racquet"[All Fields] AND "sports"[All Fields]) OR "racquet sports"[All Fields] OR "lacrosse"[All Fields])	2,903	PubMed 6/25/2021 JM	(racquet sports OR lacrosse) translated by PubMed
#2	"racquet sports"[MeSH Terms] OR ("racquet"[All Fields] AND "sports"[All Fields]) OR "racquet sports"[All Fields] OR "lacrosse"[All Fields]	2,903	PubMed 6/25/2021 JM	lacrosse translated by PubMed
#3	" <u>lacross*</u> "[All Fields]	743	PubMed 6/25/2021 JM	trying truncation
#4	" <u>lacross*</u> "[All Fields] NOT ("racquet sports"[MeSH Terms] OR ("racquet"[All Fields] AND "sports"[All Fields]) OR "racquet sports"[All Fields] OR "lacrosse"[All Fields])	36	PubMed 6/25/2021 JM	36 additional articles are picked up through truncation **Note: scanned all 36, and not useful results. pulls in articles with "LaCross" as an author
#5	"lacrosse*"[All Fields]	710	PubMed 6/25/2021 JM	trying a different truncation

Example Search

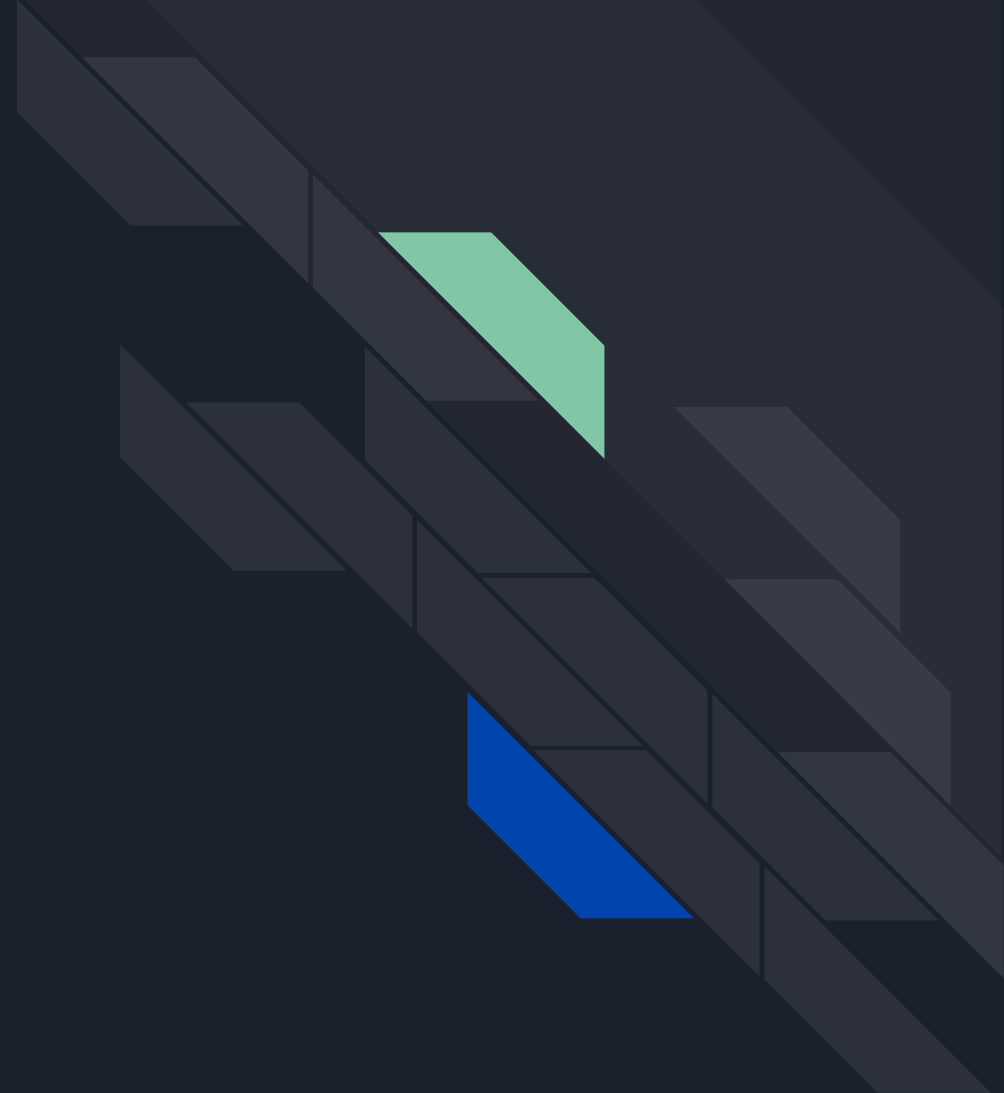


Register Your Protocol

Why Register Your Protocol?

- Improves transparency
 - Improves reproducibility
 - Reduces bias
 - Stakes your place - ensures other research teams do not duplicate your efforts
- [PROSPERO](#) - Health and Social Care
 - [Cochrane](#) - Healthcare
 - [Campbell Collaboration](#) - Business and Management, Crime and Justice, Disability, Education, International Development, Knowledge Translation and Implementation, Methods, Nutrition, and Social Welfare
 - [Collaboration for Environmental Evidence](#) - Environmental Issues
 - [Open Science Framework](#) - Multidisciplinary

Helpful Tools and Links





Helpful Tools

Citation Managers

- [EndNote](#)
- [Mendeley](#)
- [Zotero](#)

Check out a [Library Workshop](#) on a citation manager.

Systematic Review Tools

- [Rayyan](#)
- Covidence
- DistillerSR
- [Systematic Review Accelerator](#)
- Excel - the old fashioned way



More Helpful Tools

- [SR Toolbox](#)
- [PRISMA Checklist](#)
- [PRISMA-P](#) - for protocols
- [PRISMA-ScR](#) - for scoping reviews
- [Polyglot Search Tool](#)
- [Database Syntax Guide](#) - from Cochrane
- [Critical Appraisal Skills Programme](#)
- [Introduction to Systematic Review and Meta-Analysis](#) - Coursera by Johns Hopkins University
- [Cochrane Interactive Learning](#)
- [SnowGlobe](#)

Browser Extensions for Full-Text

UnPayWall

LibKey Nomad

NIH U.S. National Library of Medicine
National Center for Biotechnology Information

PubMed.gov occupational therapy AND hip fracture Search

Search results Save Email

Review > Cochrane Database Syst Rev, (1), CD007624 2010 Jan 20

Rehabilitation Interventions for Improving Physical and Psychosocial Functioning After Hip Fracture in Older People

Maria Crotty¹, Kathleen Unroe, Ian D Cameron, Michelle Miller, Gilbert Ramirez, Leah Couzner
Affiliations + expand
PMID: 20091644 DOI: 10.1002/14651858.CD007624.pub3

Download PDF

Abstract

Background: Social and psychological factors such as fear of falling and strategies are thought to be important in the recovery from hip fracture.

Objectives: To evaluate the effects of interventions aimed at improving functioning after hip fracture.

Search strategy: We searched the Cochrane Bone, Joint and Muscle Register (September 2009), the Cochrane Central Register of Controlled Trials (September 2009), MEDLINE and EMBASE (to December 2008), other related articles.

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- Look for the open padlock

1 Is Occupational Therapy After Hip Fracture Surgery Effective in Improving Function?: A Systematic Review and Meta-Analysis of Randomized Controlled Studies.
Lee SY, et al. Am J Phys Med Rehabil 2010. PMID 30300233

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REVIEW METHODS: We searched for randomized controlled trials comparing occupational therapy with comprehensive postoperative care (without occupational therapy) after hip fracture surgery. ...Therefore, occupational therapy can be suggested in comprehensive rehabilitation programs after hip fracture surgery...

Cite Share

2 Effectiveness of Occupational Therapy Interventions for Lower-Extremity Musculoskeletal Disorders: A Systematic Review.
Dorsey Land Bradshaw M. Am J Occup Ther 2017 - Review. PMID 28027040

Article Link View Complete Issue

This systematic review examined the literature published between 1995 and July 2014 that investigated the effectiveness of occupational therapy interventions for lower-extremity musculoskeletal disorders. ...Occupational therapy interventions for lower-extremity musculoskeletal disorders can reduce pain, improve function, and reduce the need for surgery and pain. ...

Cite Share

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 - Takes you to ILL page to request when necessary



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 - Focus your research question
 - Recommend type of review for your question
 - Recommend places to search (databases or grey literature)
 - Database training
 - Identify search concepts
 - Suggest protocol registries
- [Systematic Review LibGuide](#)

Questions?

The background features a series of dark grey, parallel lines that create a sense of depth and perspective, receding towards the right. Two distinct colored shapes are integrated into this pattern: a light green parallelogram and a blue parallelogram, both positioned on the right side of the frame.



Thank You for Your Attention!

Feel free to reach out with questions
or to continue the conversation.

Jenn Monnin
WVU Health Sciences Library
Jennifer.Monnin@mail.wvu.edu